

HAINING PAN

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9209 Limestone Pl
College Park, MD 20740

EDUCATION

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| Ph.D. University of Maryland, College Park, Physics
Advisor: Sankar Das Sarma
PhD candidate | Aug. 2017 to now |
| B.Sc. Nanjing University, Physics | Sept. 2013-Jun. 2017 |
| B.Eng. Nanjing University, Computer Science | Sept. 2013- Jun. 2017 |

RESEARCH INTEREST

- Topological quantum computing
- Strongly correlated system
- Topological phases of matter
- Machine learning

RESEARCH EXPERIENCE

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| Majorana zero modes in semiconductor-superconductor nanowires | 2017 to now |
| <ul style="list-style-type: none">• Simulate the transport properties of nanowire in the presence of disorder• Use the random matrix to simulate zero-bias peaks in class D ensemble | |
| Twisted bilayer | 2019 to now |
| <ul style="list-style-type: none">• Construct an extended Hubbard model and Heisenberg model in twisted bilayer• Discover a field-tunable Dzyaloshinskii–Moriya interaction in the system• Discover rich quantum phase diagrams at various fractional filling factors• Predict a platform for realizing quantum anomalous Hall effect and spin liquid | |

PUBLICATIONS

- Pan, H.,** Wu, F. and Das Sarma, S, “Quantum Phase Diagram of a Moiré-Hubbard model” arXiv:2008.08998, 2020
- Pan, H.,** Wu, F. and Das Sarma, S, “Band topology, Hubbard model, Heisenberg model, and Dzyaloshinskii-Moriya interaction in twisted bilayer WSe₂” Physical Review Research 2, 033087 (2020)
- Pan, H.** and Das Sarma, S, “Physical mechanisms for zero-bias conductance peaks in Majorana nanowires” Physical Review Research 2 (1), 013377 (2020)

Pan, H., Cole, W.S., Sau, J.D. and Das Sarma, S., “Generic quantized zero-bias conductance peaks in superconductor-semiconductor hybrid structures” Physical Review B 101 (2), 024506. (2020)

Pan, H., Sau, J.D., Stanescu, T. and Das Sarma, S., “Curvature of gap closing features and the extraction of Majorana nanowire parameters” Physical Review B 99 (5), 054507. (2019)

Pan, H., Winkler, K., Powlowski, M., et al and Kim, N. Y., “Two-kind boson mixture honeycomb Hamiltonian of Bloch exciton-polaritons” Physical Review B 99 (4), 045302 (2019)

Sett, A, **Pan, H.**, Falloon, P.E. and Wang, J.B., “Zero transfer in continuous-time quantum walks” Quantum Information Processing 18 (5), 159. (2019)

Huang, Y, **Pan, H.**, Liu, CX., Sau, J.D., Stanescu, T. and Das Sarma, S., “Metamorphosis of Andreev bound states into Majorana bound states in pristine nanowires” Physical Review B 99 (5), 054507. (2018)

PROFESSIONAL SERVICE

Peer-Reviewed Articles for:

- Physical Review B
- Physical Review Letter

COMPUTER SKILLS

Programming: MATLAB, Mathematica, Python, C++, Shell Script, Julia, ASM, Pascal

Platforms & Packages: Slurm, Linux, PyTorch

HONORS AND FELLOWSHIP

First tier Dean Fellowship by University of Maryland, 2018-2019

First tier Dean Fellowship by University of Maryland, 2017-2018

China National Scholarship, top 0.1% undergraduate, 2015

REFERENCES

Dr. Sankar Das Sarma,

Condensed Matter Theory Center, University of Maryland

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Dr. Jay Deep Sau,

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